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WHY ARMY PROGRAM MANAGERS STRUGGLE AS LIFE CYCLE MANAGERS: A STUDY OF THE PM'S ROLES, RESPONSIBILITIES, AND BARRIERS IN THE EXECUTION OF OPERATIONS AND SUPPORT

September 2016

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RESPONSIBILITIES, AND BARRIERS IN THE EXECUTION OF
OPERATIONS AND SUPPORT**

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An evaluation of the PM's environment was conducted by analyzing PM and key stakeholder roles, responsibilities, resources, processes, and expectations. A gap analysis was performed and identified the loss of control perceived by the PM to be centered on the lack of LCSP funding control and visibility by the acquisition chain of command. The authors recommend a revision to Army Regulation 700-127 and DA PAM 700-127 in order to clarify the accountability of the PM and the Life Cycle Management Commands.

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LIST OF ACRONYMS AND ABBREVIATIONS

AAE	Army Acquisition Executive
ACAT	Acquisition Category
ACOM	Army Command
AIS	Automated Information System
AMC	U.S. Army Materiel Command
AMCOM	Aviation and Missile Command
APB	Acquisition Program Baseline
ASA(ALT)	Assistant Secretary of the Army for Acquisition, Logistics, and Technology
ASCC	Army Service Component Command
ASN(RDA)	Assistant Secretary of the Navy for Research, Development & Acquisition
BAE	BAE Systems, a Defense Contractor
CAE	Component Acquisition Executive
CECOM	Communications-Electronics Command
CLS	Contractor Logistics Support
COCOM	Combatant Commands
DA	Department of the Army
DAE	Defense Acquisition Executive
DAU	Defense Acquisition University
DEPSECDEF	Deputy Secretary of Defense
DOD	Department of Defense
DODD	Department of Defense Directive
DODI	Department of Defense Instruction
DRU	Direct Report Unit
E&MD	Engineering and Manufacturing Development
FD	Full Deployment
FORSCOM	U.S. Army Forces Command
FRP	Full-Rate Production
FY	Fiscal Year

ICS	Interim Contractor Support
IOC	Initial Operational Capability
IPT	Integrated Product Team
JAP	Joint Applied Project
JCIDS	Joint Capabilities Integration and Development System
JM&L	Joint Munitions and Lethality
JPMO	Joint Program Management Office
LCMC	Life Cycle Management Commands
LCSP	Life Cycle Sustainment Plan
LD	Limited Deployment
LOGCOM	Logistics Command
LOGSA	Logistics Support Activity
LORA	Level of Repair Analysis
LRIP	Low-Rate Initial Production
LW155	Lightweight 155mm Howitzer Program
MAIS	Major Automated Information System
MARCORSYSCOM	Marine Corps System Command
MATDEV	Material Developer
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Programs
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NDAA	National Defense Authorization Act
O&M	Operations and Maintenance
O&S	Operations and Support
OMA	Operations and Maintenance, Army
OPA	Other Procurement, Army
OT&E	Operational Test and Evaluation
P&D	Production and Deployment
PBA	Performance-Based Arrangement
PBL	Performance Based Logistics
PBLCS	Performance-Based Life Cycle Support

PBPSS	Performance-Based Product Support Strategies
PEO	Program Executive Office
PEO-Ammo	Program Executive Office for Ammunition
PFSA	Post-Fielding Support Analysis
PM	Program Manager
PMCS	Preventative Maintenance, Checks and Services
PM TAS	Program Manager Towed Artillery Systems
PPSP	Post Production Support Plans
PSA	Product Support Arrangements
PSM	Product Support Manager
PSP	Product Support Provider
RDT&E	Research Development Test and Evaluation
SAE	Service Acquisition Executives
SAF/AQ	Assistant Secretary of the Air Force (Acquisition)
SECDEF	Secretary of Defense
SSTS	Sustainment Systems Technical Support
TAD	Towed Artillery Digitization
TAS	Towed Artillery System
TACOM	Tank and Automotive Command
TDA	Table of Distributions and Allowances
TI	Technology Insertion
TRADOC	U.S. Army Training and Doctrine Command
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics
USMC	United States Marine Corps

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I. INTRODUCTION

A. A PROGRAM MANAGER'S PURPOSE

A program manager (PM) within the Department of Defense (DOD) is an individual charged with delivering effective, affordable, and supportable systems to the Soldiers, Sailors, Marines, and Airmen (Warfighters) of the U.S. military as expeditiously as possible. A PM supports the Warfighter's needs by balancing the factors affecting cost, schedule, and performance throughout phases of a system's life cycle. The PM is the consistent focal point for the design, development, production, testing, fielding, operation, support, and disposal of a particular system. A PM works with key stakeholders, typically within an integrated product team (IPT) construct, in order to address the myriad issues associated with a particular system's progression from the "cradle" to "grave." Thus, a PM is responsible for the entire life cycle of a specific program, as defined in the DOD acquisition process in Figure 1.

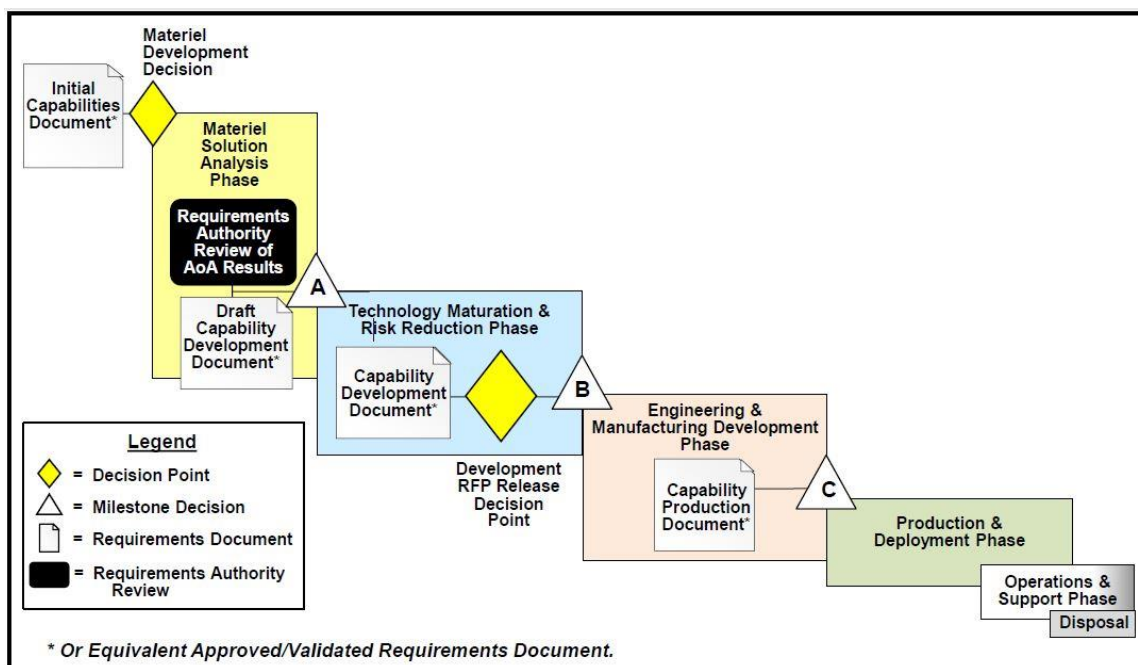


Figure 1. Defense Acquisition Process. Source: Department of Defense (2015a)

B. A PM'S AUTHORITY

PMs derive their authority and commitment to a system's life cycle from the DOD 5000 series of documents and the acquisition chain of command. The formal issuing of DOD Directive (DODD) 5000.1 in 1971 (Ferrara, 1996, p. 111) established the evolutionary development of the series of documents that currently form the foundation of a DOD PM's roles and responsibilities. The documents comprising the DOD 5000 series are the DODD 5000.01 (written May 12, 2003, and certified current as of November 20, 2007) and DOD Instruction (DODI) 5000.02 (January 7, 2015).

The PM works within the acquisition chain of command in support of the operational chain of command, which by design, are separate from one another all the way up to the Secretary of Defense. This separation helps to focus PMs on supporting the programs they manage in a balanced fashion, concentrating on what would be best for the program and its key stakeholders as a whole. If a PM were chosen from an organization within the operational chain of command, and subsequently beholden to that chain for performance evaluation and career progression, the organization could have an unbalanced influence on the development of the program in question. As an example, if the PM for a major weapon system were chosen from an Army depot and still programmatically and administratively answerable to the depot chain of command, the PM may be unreasonably pressured to focus more on the sustainment attributes of the system versus the operational capabilities or procurement costs when making trade-offs. PMs must consider all stakeholders concerns and work alongside them to successfully produce a system. Ensuring that key stakeholders are unable to directly influence the PM's career progression mitigates the risk of unfairly favoring one set of key stakeholder concerns and/or requirements over another's.

The DOD acquisition chain starts with the Defense Acquisition Executive (DAE), who supervises and is responsible for the entire Defense Acquisition system, and ends with the PM responsible for the acquisition and implementation of individual systems (Department of Defense, 2015a), as shown in Figure 2.

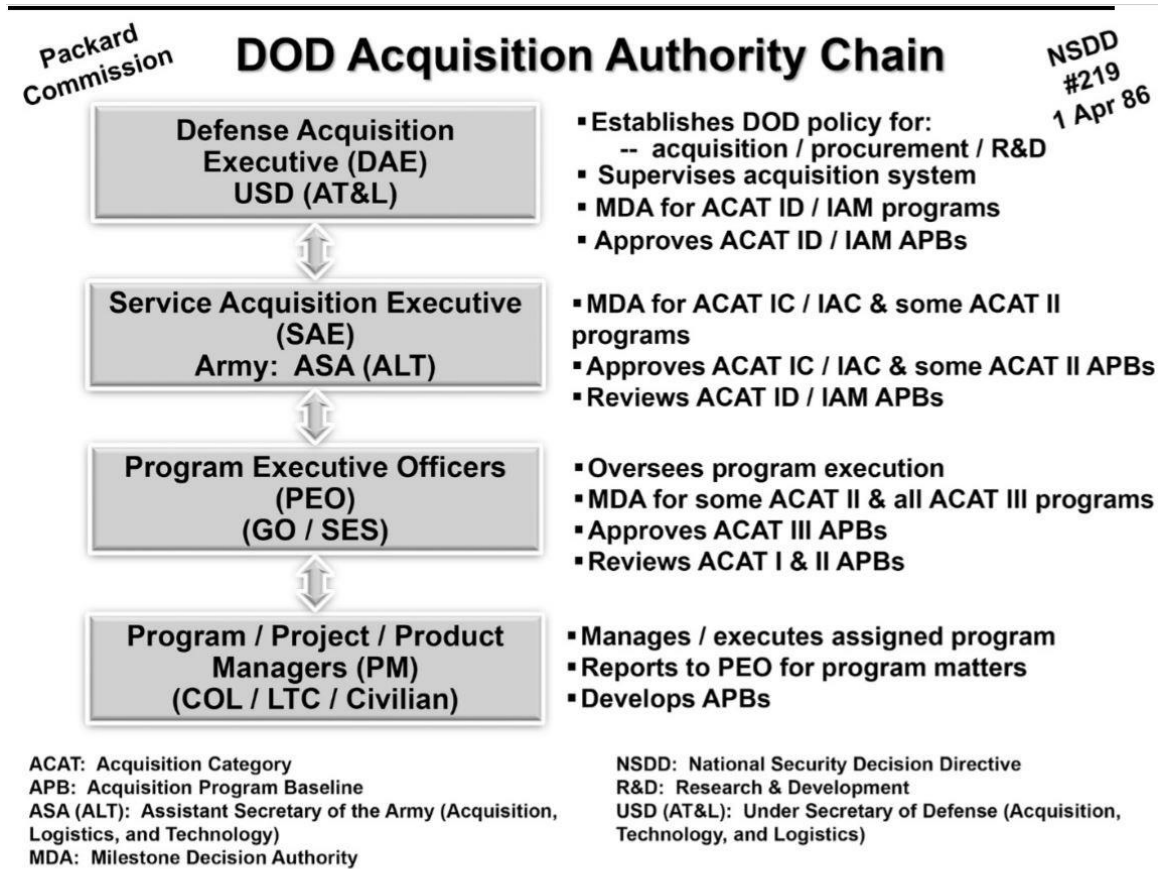


Figure 2. DOD Acquisition Authority Chain. Source: U.S. Army War College (2015)

C. PROGRAM MANAGER, TOWED ARTILLERY SYSTEMS

Program Executive Office Ammunition (PEO Ammo), under the Assistant Secretary of the Army for Acquisition, Logistics, and Technology (ASA[ALT]) portion of the acquisition chain of command, has experienced issues ensuring the success of its PMs as life cycle managers. Specifically, PEO Ammo pointed to a perceived misalignment between a PM's responsibilities and funding authority within several of their PM offices. The primary example to be examined by this JAP effort is from the PM Towed Artillery Systems (TAS), a joint U.S. Marine Corps (USMC)/Army office. PM TAS manages the M777A2 system, which is a lightweight, 155-mm howitzer system, also known as the LW155.

D. PROBLEM STATEMENT

PM TAS, like all PMs under PEO Ammo and most within the Army, has visibility and control of their Research, Development, Test, and Evaluation (RDT&E) as well as Procurement (Other Procurement, Army–OPA) funding via the acquisition chain for all phases of the acquisition process up to the Operations and Support (O&S) phase. Once a program/system transitions into the O&S phase, the funding for this portion of the life cycle (Operations and Maintenance, Army–OMA) is no longer controlled by the acquisition chain but instead is controlled by the operational chain of command. In this case, the Army Materiel Command (AMC) controls the OMA funding for Army programs transitioning into the O&S phase.

The consolidation of OMA funding requests for all of the systems supporting the Army creates a loss of fidelity into any specific system’s funding requirements at the AMC level. Therefore, the PM has reduced visibility into the O&S funding for his or her particular system because of this lack of funding detail at AMC. This lack of visibility and control over the system funding is cited as a major obstacle by the PM in implementation of a best-value support strategy for the LW155 system within this phase of the acquisition life cycle.

E. RESEARCH OBJECTIVES

In order to find the root cause of PM TAS’s, and by extension, PEO Ammunition’s, difficulty in maintaining programmatic control during the O&S phase, we must address the following questions:

1. Primary Research Question

With the transition to O&S, do current Army policies and processes allow PM TAS to effectively manage the LW155 system in accordance with the PM responsibilities outlined in the DOD 5000 series documents?

2. Secondary Research Questions

- What is an Army PM’s role and responsibilities within the O&S phase of system’s life cycle?

- Are PM TAS and PEO Ammo, by extension, following current Army and DOD policy?
- What gaps, if any, exist within Army or DOD policy that fail to cover key aspects of PM's role and responsibilities within the O&S phase of a system's life cycle?

F. METHODOLOGY

This project investigated an Army PM's efforts in transitioning a system from the end of the Production and Deployment (P&D) phase into the Operations and Support phase, mapping his or her actions to the respective Army and DOD policy/regulation. Specifically, we focused on PM TAS's transition of the LW155 into the O&S phase. We identified the planning and actions leading to the LW155's transition into O&S through a comprehensive analysis of their Supportability Strategy and intra-service Memorandum of Agreement (MOA). We then took a detailed accounting of the LW155's processes and compared them against the DOD 5000 series documents, the *Defense Acquisition Guidebook*, the *Joint Program Managers Handbook*, the *Product Support Managers Guidebook*, the *Manual for the Operation of the Joint Capabilities Integration and Development System*, Army regulations/pamphlets and policy memorandums. Our methodology concludes with recommendations for changes and clarifications to policy, as appropriate.

G. REPORT ORGANIZATION

This research report contains five chapters. The next chapter provides an overview of the DOD and Army policies and guidance applicable to PMs, armed service logistics commands, key personnel, and system operator communities during the O&S phase. In Chapter III, the authors provide a background of PM TAS and outline the planning and actions taken by PM TAS and AMC as the LW155 system transitioned into the O&S phase. Chapter IV identifies and analyzes the findings from the previous two chapters, highlighting any misalignment of authority and accountability. Finally, the last chapter describes the conclusions and recommended courses of actions.

H. SUMMARY

This chapter provided a summary of a PM's role, responsibilities, and source of authority. Additionally, this initial chapter provided an overview of the DOD acquisition process, the acquisition chain of command, an introduction to PM TAS, and identification of the research questions central to this JAP. Finally, this chapter articulated the methodology used in analyzing the problem. In the following chapter, we review the policies and procedures the DOD and Army have set forth for the management of these programs.

II. POLICY ON PM ROLES AND RESPONSIBILITIES

A. DEVELOPMENT OF DEFENSE ACQUISITION POLICY AND GUIDELINES

The purpose of the Defense Acquisition System is to “to manage the nation’s investments in technologies, programs, and product support necessary to achieve the National Security Strategy and support the United States Armed Forces” (Department of Defense, 2003, p. 5). In order to facilitate the management of the full spectrum of potential programs needed by DOD, programs are classified into specific Acquisition Categories (ACAT) and type. The ACAT level is primarily based on the dollar value of the program and its criticality. The type designation for a program is determined by the kind of system the program is focused on developing, and its intended use. Major Defense Acquisition Programs (MDAP) are typically weapon systems, whereas Major Automated Information Systems (MAIS) are typically not weapon systems. A brief overview of the different program designations is presented in Figure 3.

Acquisition Category	Reason for ACAT Designation	Decision Authority
ACAT I	<ul style="list-style-type: none"> ■ MDAP (10 U.S.C. 2430 (Reference (g))) <ul style="list-style-type: none"> • Dollar value for all increments of the program: estimated by the DAE to require an eventual total expenditure for research, development, and test and evaluation (RDT&E) of more than \$480 million in Fiscal Year (FY) 2014 constant dollars or, for procurement, of more than \$2.79 billion in FY 2014 constant dollars • MDA designation ■ MDA designation as special interest¹ 	<p>ACAT ID: DAE or as delegated</p> <p>ACAT IC: Head of the DoD Component or, if delegated, the CAE (not further delegable)</p>
ACAT IA ^{2,3}	<ul style="list-style-type: none"> ■ MAIS (10 U.S.C. 2445a (Reference(g))): A DoD acquisition program for an Automated Information System⁴ (AIS) (either as a product or a service⁵) that is either: <ul style="list-style-type: none"> • Designated by the MDA as a MAIS program; or • Estimated to exceed: <ul style="list-style-type: none"> ○ \$40 million in FY 2014 constant dollars for all expenditures, for all increments, regardless of the appropriation or fund source, directly related to the AIS definition, design, development, and deployment, and incurred in any single fiscal year; or ○ \$165 million in FY 2014 constant dollars for all expenditures, for all increments, regardless of the appropriation or fund source, directly related to the AIS definition, design, development, and deployment, and incurred from the beginning of the Materiel Solution Analysis Phase through deployment at all sites; or ■ \$520 million in FY 2014 constant dollars for all expenditures, for all increments, regardless of the appropriation or fund source, directly related to the AIS definition, design, development, deployment, operations and maintenance, and incurred from the beginning of the Materiel Solution Analysis Phase through sustainment for the estimated useful life of the system. ■ MDA designation as special interest¹ 	<p>ACAT IAM: DAE or as delegated</p> <p>ACAT IAC: Head of the DoD Component or, if delegated, the CAE (not further delegable)</p>
ACAT II	<ul style="list-style-type: none"> ■ Does not meet criteria for ACAT I or IA ■ Major system (10 U.S.C. 2302d (Reference (g))) <ul style="list-style-type: none"> • Dollar value: estimated by the DoD Component Head to require an eventual total expenditure for RDT&E of more than \$185 million in FY 2014 constant dollars, or for procurement of more than \$835 million in FY 2014 constant dollars • MDA designation⁵ (10 U.S.C. 2302 (Reference (g))) 	CAE or the individual designated by the CAE ⁶
ACAT III	<ul style="list-style-type: none"> ■ Does not meet criteria for ACAT II or above ■ An AIS program that is not a MAIS 	Designated by the CAE ⁶
<p>1. The Special Interest designation is typically based on one or more of the following factors: technological complexity; congressional interest; a large commitment of resources; or the program is critical to the achievement of a capability or set of capabilities, part of a system of systems, or a joint program. Programs that already meet the MDAP and MAIS thresholds cannot be designated as Special Interest.</p> <p>2. When a MAIS program also meets the definition of an MDAP, the DAE will be the MDA unless delegated to a DoD Component or other official. The DAE will designate the program as either a MAIS or an MDAP, and the Program Manager will manage the program consistent with the designation.</p> <p>3. The MDA (either the DAE or, if delegated, the DoD Chief Information Officer (CIO) or another designee) will designate MAIS programs as ACAT IAM or ACAT IAC. MAIS programs will not be designated as ACAT II.</p> <p>4. AIS: A system of computer hardware, computer software, data or telecommunications that performs functions such as collecting, processing, storing, transmitting, and displaying information. Excluded are computer resources, both hardware and software, that are an integral part of a weapon or weapon system; used for highly sensitive classified programs (as determined by the Secretary of Defense); used for other highly sensitive information technology (IT) programs (as determined by the DoD CIO); or determined by the DAE or designee to be better overseen as a non-AIS program (e.g., a program with a low ratio of RDT&E funding to total program acquisition costs or that requires significant hardware development).</p> <p>5. When determined by the USD(AT&L) (or designee), IT services programs that achieve the MAIS threshold will follow the procedures applicable to MAIS programs specified in this instruction. All other acquisitions of services will comply with Enclosure 9 of DoD Instruction 5000.02 (Reference (h)) until cancelled by issuance of the new acquisition of services instruction.</p> <p>6. As delegated by the Secretary of Defense or Secretary of the Military Department.</p>		

Figure 3. ACAT Designation Chart. Source: Department of Defense (2015a)

B. ACQUISITION CHAIN OF COMMAND

The Under Secretary of Defense for Acquisition, Technology, and Logistics (USD[AT&L]) outlines the roles and responsibilities of the acquisition chain of command within DOD Instruction 5000.02 “Operation of the Defense Acquisition System.” The following is a summary of the acquisition positions in DODI 5000.02 relevant to this research:

1. Defense Acquisition Executive (DAE)

The USD(AT&L) serves as the DAE, retaining the final authority and responsibility for all DOD acquisition matters, deferring only to the Secretary of Defense (SECDEF) and the Deputy Secretary of Defense (DEPSECDEF).

2. Component Acquisition Executive (CAE)

The DOD acquisition chain continues with the CAE, which is sometimes referred to as the service acquisition executives (SAE). Each branch of the armed services has a designated SAE, and within the Army, this position is referred to as the Army Acquisition Executive (AAE). The ASA(ALT) serves as the AAE.

3. Milestone Decision Authority (MDA)

The DAE, through the CAE portion of the acquisition chain of command, will normally assign or delegate the assignment of oversight for specific programs based on that program’s ACAT level and type. The MDA is empowered with the execution of this oversight. The ACAT and program type dictate the level of scrutiny placed on the management and documentation detail required in order to support the execution of programmatic decisions by the respective MDA. The MDA’s responsibilities include

- Approving program transition from one phase of the acquisition process to another.
- Overseeing the program’s cost, performance, and schedule.

4. Program Executive Officer (PEO)

Because of their high dollar value and/or their criticality, ACAT I programs as well as any sensitive classified programs are typically assigned by CAEs to a PEO. PEOs

are dedicated executive management organizations with no other command responsibilities beyond their assigned programs, routinely making them ideal candidates to apply the required amount of rigor and oversight to these acquisition programs. Additionally, a DOD acquisition program under a PEO's management may only be transferred to a military service's operational, logistics, or materiel command after "the program or increment of capability has passed Initial Operational Capability and has been approved for Full-Rate Production or Full Deployment" (Department of Defense, 2015a, pp. 73–74). PEOs will often manage several programs through separate PMs.

PEO Ammunition is the specific PEO office that we are concerned with for this research. PM TAS is one of PEO Ammunition's subordinate PMs under this acquisition chain of command.

5. Program Manager (PM)

The Army distinguishes between program managers in a manner unique among the armed services. An official charter will typically designate an Army PM as a program manager, a project manager, or product manager (U.S. Army War College, 2015, pp. 10–32 to 10–33). The distinction between these three PM titles is based on the dollar value and criticality of the program they manage, from most costly/critical to least, respectively. DOD Directive 5000.01 and the *Manual for the Operation of the Joint Capabilities Integration and Development System (JCIDS)* provide guidance on a PM's life cycle authority. One such passage explains that "the PM shall be the single point of accountability for accomplishing program objectives for total life cycle systems management, including sustainment" (Department of Defense, 2003, p. 10 enclosure 1), and another describes life cycle management as "the implementation, management, and oversight by the PM of all activities associated with the acquisition, development, production, fielding, sustaining, and disposal of a DOD system" (Department of Defense, 2015b, pp. D-D-1). Collectively, these directives and manuals, alongside DODI 5000.02, clearly show that from a DOD perspective, the PM under an acquisition chain of command is responsible for not only the development and deployment of a system but

also the continued programmatic oversight of that system into and throughout O&S. The PM's primary responsibilities, of interest to this report, are

- Managing the cost, performance, and schedule of assigned program.
- Developing Acquisition Program Baselines (APBs).
- Establishing and managing Performance-Based Product Support Strategies (PBPSSs), as the Materiel Developer (MATDEV).
- Identifying, mitigating, and managing program risks throughout the life of a program.
- Leading the development and implementation of a Systems Engineering approach across a system's entire life cycle.
- Leading Integrated Product Teams (IPTs) comprised of key stakeholders towards the success of assigned programs.
- Assigning a Product Support Manager (PSM) for each ACAT program, in coordination with the PEO. (Department of the Army, 2014a, pp. 5–11)

The subject of this JAP, the Program Manager Towed Artillery Systems office, falls under this acquisition chain of command. PM TAS manages several acquisition programs to include the LW155, ACAT II program (ASA[ALT], 2016, p. 254).

6. Product Support Manager (PSM)

Depending on the size, complexity, and criticality of a program, a PM may delegate life cycle support planning and execution oversight to a PSM. In an effort to mitigate the risks and associated impacts from ACAT I and II programs, the FY10 National Defense Authorization Act required the assignment of a PSM to these programs under Section 805 (NDAA – Public Law 111–84). In addition to the NDAA, the roles and responsibilities of the PSM are defined in detail within the *2016 Product Support Manager Handbook* (Department of Defense, 2016). The authors extracted the following responsibilities from this year's *PMS Guidebook*:

- Developing, implementing, and managing a comprehensive product support strategy, also referred to as Performance-Based Product Support Strategies (PBPSS), throughout the system life cycle.
- Maximizing competition, to include small business participation.
- Developing, implementing, and managing Performance-Based Arrangements (PBAs), which are sometimes referred to as Product Support Arrangements (PSAs), in support of the PBPSS.

- Utilizing applicable tools and analyses to improve a system's reliability, availability, and O&S cost.
- Developing a plan for the preservations, storage, and/or disposal of all production equipment as required.
- Identifying obsolete system components and developing a mechanism for obtaining suitable replacements.
- Revalidating business-case analyses prior to a change in the PBPSS, or no later than every five years.
- Validating the PBPSS by conducting periodic cost-benefit analyses. (Department of Defense, 2016, p. 7)

7. Product Support Provider (PSP)

The PSP is responsible for achieving goals supporting the LCSP by meeting performance-based metrics. The PSP can be either a governmental organization, such as an Army depot, or a private defense contractor. If the PSP is an organic (governmental) organization, such as the Army Materiel Command, then memorandums of agreement (MOAs) or memorandums of understanding (MOUs) will typically be used by the PM to establish the roles and responsibilities of key stakeholders, as it pertains to the LCSP scope. If the PSP is a contractor, then a legal arrangement, such as a contract or task order, is typically used by the PM in order to secure the support necessary to obtain the goals outlined in the LCSP (Department of the Army, 2014b, p. 25). These legal arrangements are referred to most commonly within DOD and Army policy as performance-based arrangements (PBAs) or product support arrangements (PSAs) (Department of the Army, 2014b, p. 22).

C. OPERATIONAL ARMY CHAIN OF COMMAND

The Army operational chain of command represents the U.S. Army's portion of the Warfighters who execute the missions directed by the president of the United States, as commander-in-chief. The following sections identify the principle commands within the Army (Figure 4)

1. Army Command (ACOM)

An ACOM is an Army force, designated by the SECARMY, performing multiple Army Service Title 10 functions (3013b) across multiple disciplines. Command responsibilities are those established by the SECARMY. The three ACOMs are as follows (a) TRADOC, Joint Base Langley-Eustis, VA. (b) AMC, Huntsville, AL. (c) U.S. Army Forces Command (FORSCOM), Fort Bragg, NC. (U.S. Army War College, 2015, pp. 4–8)

a. Army Materiel Command (AMC)

The U.S. Army Materiel Command is the Army's premier provider of materiel readiness—technology, acquisition support, materiel development, logistics power projection, and sustainment—to the total force, across the spectrum of joint military operations. The command's complex missions range from development of sophisticated weapons systems and cutting-edge research, to maintenance and distribution of spare parts. AMC operates the research, development and engineering centers; Army Research Laboratory; depots, arsenals and ammunition plants; and maintains the Army's Prepositioned Stocks, both on land and afloat. (U.S. Army Materiel Command, 2016, p. 1)

AMC has four Life Cycle Management Commands (LCMC) that serve as the Army's PSP for organic (Army) depot and supply chain product support (Department of the Army, 2014b, p. 22). These LCMCs, although under the operational chain of command, are a hybrid combination of AMC subordinate commands and ASA(ALT) PEO offices from the acquisition chain of command. LCMCs began to form in 2004 with the intent of bringing the acquisition, logistics, and technology communities together to better support the Warfighter under a single manager, referred to as a "trail boss," for specific systems (U.S. Army War College, 2015, pp. 10–61). The current LCMCs are

- Aviation and Missile Command (AMCOM)
- Communications-Electronics Command (CECOM)
- Joint Munitions and Lethality (JM&L)
- Tank-Automotive and Armaments Command (TACOM)

b. Training and Doctrine Command (TRADOC)

TRADOC is the Army's designated representative for Warfighter capability development with several areas of focus including recruiting and training Soldiers,

professionally developing military and civilian leaders, developing and guiding the evolution of Army doctrine, and utilizing materiel, force structure, and capabilities to mold the Army (U.S. Army Training and Doctrine Command, 2016).

c. Forces Command (FORSCOM)

The U.S. Army Forces Command is an organization composed of Active, Reserve, and National Guard Soldiers. FORSCOM is the largest Army command and provides forces to regionally focused Combatant Commands (COCOMs) in order to support a wide-range of military missions (United States Army Forces Command, n.d.).

2. Army Service Component Command (ASCC)

An ASCC is a regionally aligned organization, with a primary focus of supporting COCOMs in the execution of their missions (U.S. Army War College, 2015, pp. 4–8).

3. Direct Report Unit (DRU)

An Army DRU is a specialized organization, which provides a range of unique support services to other Army units while being accountable only to the Secretary of the Army or a designated representative (U.S. Army War College, 2015, pp. 4–7).

ARMY COMMAND STRUCTURE

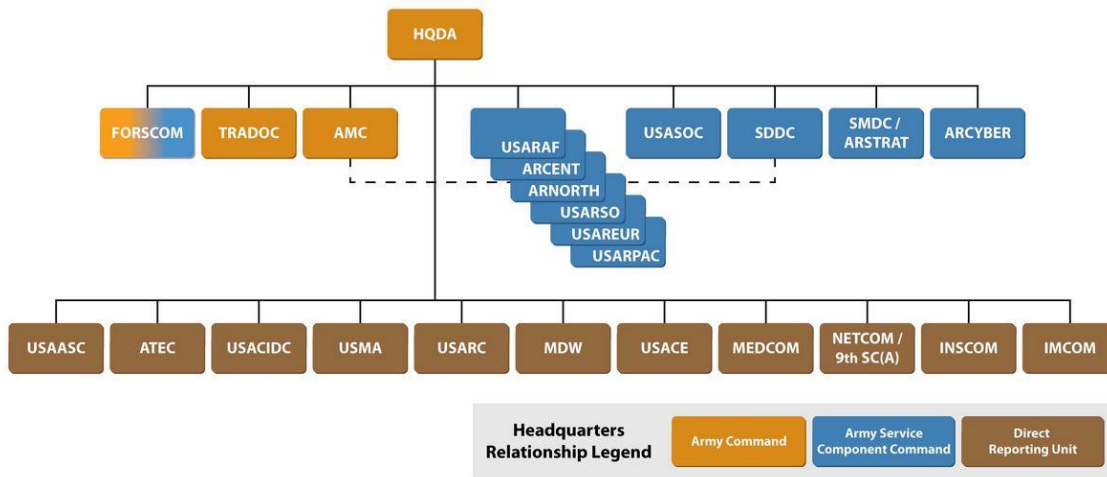


Figure 4. Operational Army Chain of Command. Source: U.S. Army (2016)

D. PM ACTIONS DURING LATE P&D PHASE

Current DOD and Department of the Army (DA) policy and guidance outline a roadmap for PMs to transition a system from the P&D phase to the O&S phase of the defense acquisition process. Even though the P&D and O&S phases are distinct stages of the acquisition process with their own scopes and milestones, there is typically chronological overlap between the two with the O&S phase starting prior to the completion of the P&D phase.

1. Low-Rate Initial Production / Limited Deployment (LRIP / LD)

After Low-Rate Initial Production (LRIP), or Limited Deployment (LD), depending on whether the program in question is predominantly a weapon system or AIS, the PM will work closely with operational (ASCC) and sustainment (ACOM & DRU) communities to successfully complete Operational Test and Evaluation (OT&E). During this portion of the P&D phase, the PM will focus on the manufacturing and deployment actions, ensuring that they are proceeding as planned or adjusting the appropriate engineering, implementation, or operational considerations as needed. The PM must ensure that communications and collaborations across the program IPT are timely and

effective in not only addressing programmatic issues but also in identifying and addressing concerns from the operational chain of command stakeholders (e.g., ACOMs, ASCCs, and DRUs). In particular, OT&E issues related to system capabilities and supportability are critical items of concern for the PM. With the successful completion of OT&E, the MDA's approval for the start of Full-Rate Production (FRP)/Full Deployment (FD) can be sought.

a. Funding from Program Inception

As a program starts to undergo LRIP/LD, it presents the PM an opportunity to transition from utilizing primarily RDT&E funding to procurement funding (U.S. Army War College, 2015, pp. 10–49). Up to this point in the program acquisition process, completion of milestones and entry into the P&D phase, the scope has most likely been exclusively one that necessitated RDT&E funding. Depending on the production quantity and costs, or level of deployment and associated costs for AIS, a case could be made for the use of either RDT&E or procurement funds. Both RDT&E and procurement funds are typically provided to the PM via the acquisition chain of command, affording the PM a fair measure of visibility and control.

b. Policy / Guidance (from Program Inception)

“Directive-Type Memorandum (DTM) 10–015 – Requirements for Life Cycle Management and Product Support” (Change 3, January 16, 2013) mandates the assignment of a PSM for all ACAT I and ACAT II programs. This memorandum and the associated references within it outline the scope of a PSM leading up to this point in the acquisition life cycle with regard to preparing for a successful product support transition from P&D to O&S.

DODI 5000.02 mandates the development of an LCSP starting at Milestone A, Figure 5 (Department of Defense, 2015a, p. 114). The LCSP outlines the methodology and resources required for the successful implementation of the PBPSS. As the system in question evolves during its life cycle, so must the LCSP be updated to reflect any required shift in the support strategy (USD[AT&L], 2013). The LCSP, as a living

document, would be updated during this phase of the acquisition process to reflect any lessons learned from the execution and completion of LRIP/LD and OT&E.

The “Weapon System Resource Transition to Sustainment Guidance” ASA(ALT) memorandum, dated April 5, 2012, mandates the development and submission of a concept plan to ASA(ALT) by all Army PMs no later than two years prior to the end of production. The purpose of this concept plan is for the PMs to outline and obtain concurrence for their personnel reduction approach as they transition from P&D to O&S.

The “Concept Plan Guidance” DA memorandum, dated March 31, 2010, provides guidance on how to develop and submit a concept plan. This guidance is used in conjunction with the previously mentioned ASA(ALT) memorandum to plan for and seek the approval of required personnel changes for the successful transition into and execution of a system’s O&S phase.

Army Regulation 71–32, Force Development and Documentation mandates policies and outlines responsibilities for the documentation and development of force structure accounting, authorization, and management.

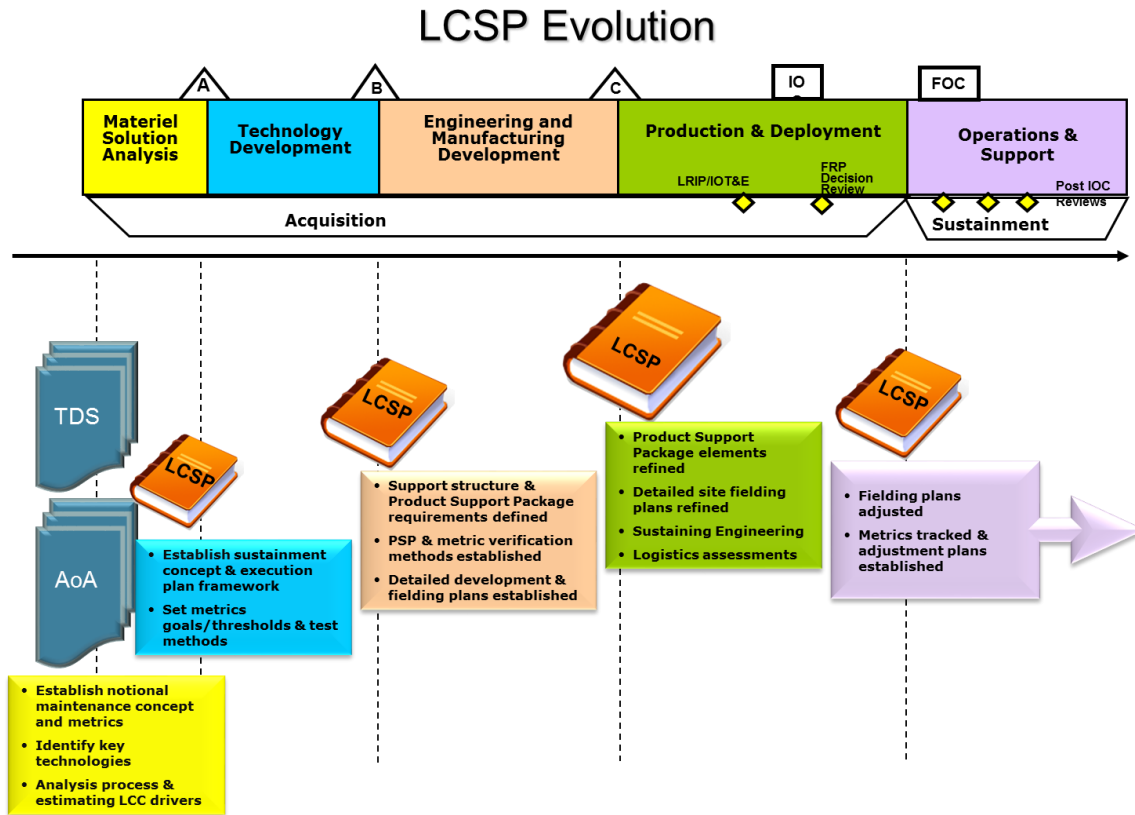


Figure 5. LCSP Evolution. Source: Defense Acquisition University (2016)

2. Full-Rate Production / Full Deployment (FRP / FD)

Prior to the fielding of system capabilities to the operational community, whether this occurs during LRIP/LD or during FRP/FD, Initial Operational Capability (IOC) must be reached. IOC is declared by the operational authority when the community that is to utilize the new system has been properly resourced and trained to operationally support it (Department of Defense, 2015a, p. 28). Completion of this milestone, IOC, usually signals the start of the O&S phase.

a. Funding

Whereas with LRIP/LD, RDT&E or procurement funding could be used depending on the intent of the LRIP/LD systems, with FRP/FD, it is unlikely that anything other than procurement (OPA) funding can be used (U.S. Army War College, 2015, pp. 10–49). Due to this loss of funding flexibility, PMs must ensure they maintain a

current and accurate estimation of the funding types and quantities that they will require for the remainder of the program. As the program transitions from LRIP/LD to FRP/FD, any lessons learned and programmatic adjustments brought about by this shift need to be evaluated for potential impact on the PBPSS. Since the LCSP documents the PBPSS, changes to the PBPSS also need to be reflected in the LCSP (Department of the Army, 2014a, p. 11). Any required changes to the LCSP scope and funding need to be documented and staffed for MDA approval as soon as possible, due to the proximity of the O&S phase at this point. If any changes to the LCSP occur after FRP/FD, they must be approved by the CAE (USD[AT&L], 2013, p. 9). The procurement funding necessary for FRP/PD would typically continue to be provided to the PM via the acquisition chain of command, ensuring the PM a reasonable measure of visibility and control.

b. Policy / Guidance

DODI 5000.02 mandates that the PM demonstrate “control of the manufacturing process, acceptable performance and reliability, and the establishment of adequate sustainment and support systems” (Department of Defense, 2015a, p. 29) prior to obtaining MDA concurrence to move forward with FRP/FD.

E. PM ACTIONS DURING EARLY O&S PHASE

The O&S phase starts upon the successful MDA approval of production/deployment, MDA approval of the LCSP, and the declaration of IOC by the operational authority. From this point forward, the PM transitions the physical and day-to-day control of the system to the operational chain of command (i.e., Warfighter) along with the LCSP as the principle document governing the sustainment of the system in question (Department of Defense, 2015a, p. 115). The PM maintains programmatic responsibility for the system within the O&S phase, despite not having physical or operational control of the respective system. The PM works with the operational chain of command throughout the system’s migration through the O&S phase to assess whether the fielded system continues to provide the needed capability in an effective and sustainable manner, updating the LCSP and any remaining production/deployment as needed (Defense Acquisition University, 2016, p. 4.2.7).

Throughout the O&S phase, PMs also have the responsibility of managing the evolution of system requirements, whether the changes dictate engineering change requests for immediate implementation or incorporation into future system refresh or modernization planning cycles. Supporting these planning actions and the corresponding decision making process, PMs must develop appropriate cost estimates and impact analyses. In addition to the aforementioned items, the O&S performance of a PM is measured on the system's ability to achieve the long-term affordability goals set within the LCSP (Department of the Army, 2014b, p. 99).

1. Sustainment Tools

The Army has developed a “program report card,” which utilizes a sustainment quad chart, as shown in Figure 6, to aid a PM in the execution of his or her role and responsibilities within the O&S phase (Department of the Army, 2014b, pp. 99–100).

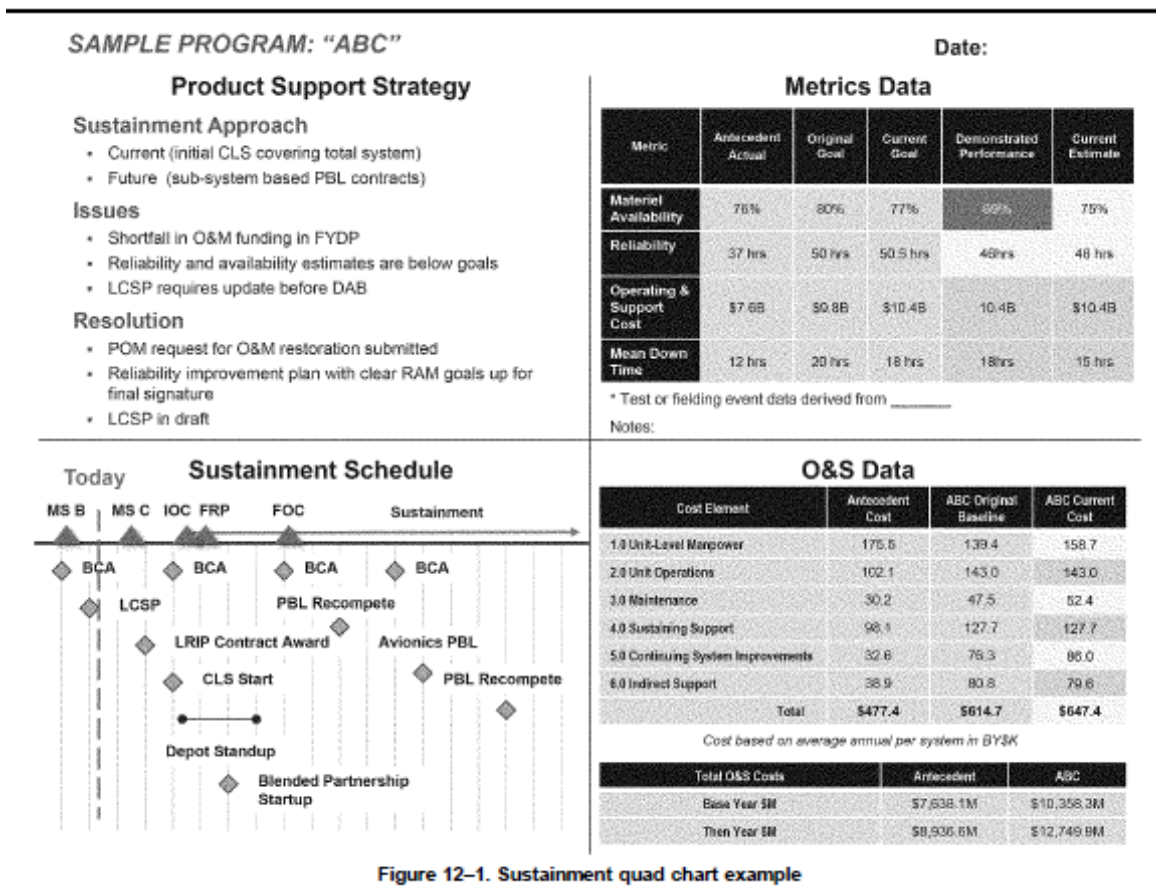


Figure 6. Sample Sustainment Quad Chart. Source: Department of the Army (2014b)

a. Product Support Strategy

The PM and PSM must actively work with the PSP in order to identify issues and solutions to the currently implemented LCSP. They also must continue to adjust the sustainment plan in order to correct issues, and adapt the plan for the operational use of the system in question (Department of the Army, 2014b, p. 100). The execution of this sustainment plan, LCSP, is the focus of this JAP. Any gap between the planned LCSP and the actual sustainment requirements and support actions executed during O&S directly reflect on the PM/PSM. When the PSP, in this case AMC, only funds a portion of the LCSP, any shortfalls in the required support are directly attributed to both AMC and the PM.

b. Schedule for Sustainment

This schedule is produced by the PM to assure that any critical milestones are identified and tracked. An example of this would be PBL contract start and end dates. This tracking will drive the team to be proactive on updating the LCSP and revising any contract documents required in order to have an uninterrupted sustainment strategy.

c. Goal-focused Metrics

The metrics are arguably the most important part of this report card. They are typically subdivided into availability and O&S cost categories. The PM would be held accountable should the system fail to comply with the required operational availability, reliability, and/or to be within the expected life cycle cost estimates. In this case, it would imply that there is a failure in the PM's LCSP, an unidentified defect, or some design flaw in the system (Department of the Army, 2014b, p. 100). The metrics shown on the chart are useful in reflecting the status of the system, although they do not indicate how this status was obtained.

2. Funding

As the PM transitions the system to the operational community, OMA funding becomes the primary means of maintaining the system from that point forward. This OMA funding is typically used for most aspects of the sustainment support from unserviceable hardware replacement, to implementing security patches on software, to paying for the labor required to take these and other required actions. Similar to how PMs lose operational control of the system going into O&S, they also start to lose financial control of the system as procurement funding for the system is expended and the system's future becomes more dependent on the operations and maintenance funding, which is not controlled by the PM. Within the Army, AMC and their LCMCs control the OMA funding for programs that transition into the O&S phase as the product support providers (PSPs) (Department of the Army, 2014a, p. 22). Despite the fact that the LCSP outlines the optimal level of funding support during this phase of the system life cycle, AMC can reprioritize portions of a system's expected OMA funding.

3. Policy / Guidance

- Army Regulation 70–1, dated July 22, 2011, implements the DOD 5000 series acquisition policies and guidance into the Army structure. Specifically, this AR addresses ACAT I through III programs under the Army’s purview.
- Army Regulation 750–1, dated September 12, 2013, establishes Army policies and assigns responsibilities for the execution and management of materiel. The scope of materiel maintenance functions covered under this AR includes both “field” and “sustainment” actions, also referred to as operator and depot operations respectively.
- Army Regulation 700–127, dated October 7, 2014, provides Army policy and assigns responsibilities for the development and implementation of Performance-Based Product Support Strategies (PBPSSs).
- Department of the Army Pamphlet 700–127, dated October 8, 2014, provides guidance and additional implementation support to the AR 700–127 with respect to the execution of PBPSS.

F. SUMMARY

This chapter provided a summary of a PM’s roles, responsibilities, chain of command, and actions as a program transitions from P&D to O&S. Additionally, this chapter identified the inheritance of authority for PMs supporting the Army from the DOD 5000 series and supporting policy/guidance documents. This chapter also touched on Army-specific distinctions for PMs as well as provided an overview of the typical types of funding used to support a program during its migration from P&D to O&S. Finally, this chapter introduced some of the key stakeholders, an overview of their roles and responsibilities, and the basis for their authority in current policy. In the following chapter, we discuss the specific actions taken by PM TAS as they transitioned the LW155 system into the O&S phase.

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III. PM TAS, O&S ROLES AND RESPONSIBILITIES

A. FORMATION OF PROJECT MANAGER, TOWED ARTILLERY SYSTEMS (1995–2015)

In 1995, after several years of parallel and independent research, the Navy and the Army established a Joint Program Management Office (JPMO) to develop the next generation of lightweight howitzer. A major component of this next generation of howitzer is a digital fire control system, Towed Artillery Digitization (TAD), which aids in target acquisition by enabling self-location and electronic aiming. The development of this TAD system was originally a separately managed effort that was eventually integrated into the JPMO's scope. The JPMO office was operated under the Marine Corps and was augmented by both active duty and civilian Army and Marine Corps personnel. Funding support for the program and JPMO office was also divided between the two services.

In 2005, the MOA for the joint office was updated to reflect the impending shift to full rate production of the Light Weight 155mm Howitzer (LW155) system, as well as the combination of the individual service efforts into a single program. (Bolton & Young, 2005) The U.S. Army Acquisition Executive, Malcolm O'Neill, approved the renaming of LW155 to PM TAS in January 2011 and provided the joint PM TAS office space at Picatinny Arsenal New Jersey. PM TAS was positioned under PEO Ammo, which acted as the lead contracting agency for the program from this point forward. In the second quarter of FY14, the final M-777 Howitzer was delivered and the program transitioned to the O&S phase (ASA[ALT], 2016, p. 254).

B. THE CURRENT SITUATION FOR THE PM TAS OFFICE (2015-CURRENT)

Presently, the PM TAS office is in a transition period, where the final weapon system has been delivered and the focus of the office is transitioning to support O&S fulltime. This transition is both a funding as well as a programmatic evolution for the office.

Primarily funded by RDT&E funding during the engineering and manufacturing development (E&MD) phase and OPA funding during the production and deployment (P&D) phase, the program is now transitioning to an OMA funded office supporting the O&S phase of the LW155 system. As the office transitions out of the P&D phase, the services are transitioning the joint office's governmental personnel support. This was being done in accordance with the ASA(ALT) memorandum titled "Weapon System Resource Transition to Sustainment Guidance" in order to support the O&S phase (Shyu, 2012). See Table 1 for the configuration of the Army portion of the PM TAS office, which includes the key position of PSM that plays a critical role during the O&S phase.

Table 1. PM TAS Authorized Personnel. Source: Department of Defense
(2015c)

LN	TITLE	GRADE	POSCO
01	DPM TAS	04	00340
02	APM ARTY MOD AE13A039A	O3	51A00
03	OPS & PLANS OFFICER	04	00301
04	ACQUISITION OFFICER	03	00301
05	PSM	04	00346
06	MGMT ANALYST	03	00343
07	GENERAL ENGINEER	03	00801
08	BUS MGMT SPEC	03	01101
09	LOGISTICS SPECIALIST	13	00346
10	PRODUCT ASSURANCE ENGR	13	00801
11	EQUIPMENT SPECIALIST	13	01670
12	VISUAL INFO SPEC	08	01084
13	RESOURCE MGMT SPEC	04	00301
14	GENERAL ENGINEER	04	00801
01	SYS PROJ ENGR	13	00801
02	PROGRAM ANALYST	04	00343
03	GENERAL ENGINEER	04	00801
04	CONFIG MGMT SPEC	13	00301
05	PROGRAM ANALYST	13	00343
06	LOGIST MANAGEMENT SPEC	12	00346
07	SYSTEMS ENGR	13	00801
08	SYSTEMS PROJECT ENGR	13	00801
09	GENERAL ENGINEER	13	00801
10	MECHANICAL ENGR	13	00830
11	OPERATIONS RSCH ANALY	13	01515
12	QUAL ASSUR/TEST ANALY	13	01910
13	FIELDING LIAISON OFCR	12	00301
14	GENERAL ENGR	12	00801
15	MECHANICAL ENGR	13	00830
16	ENGINEERING TECH	08	00802
17	PROGRAM ANALYST	13	00343
18	PROGRAM ANALYST	11	00343
19	PROGRAM COORDINATOR	12	01102
20	MECHANICAL ENGR	12	00830
21	MECHANICAL ENGR	13	00830
22	LOGISTICS SPEC	13	00346
23	GENERAL ENGINEER	12	00801
24	GENERAL ENGINEER	13	00801
25	MANAGEMENT ANALYST	12	00343
26	PROGRAM ANALYST	13	00343

In order to receive funding for the positions within the PM TAS office, the table of distributions and allowances (TDA) must have the positions authorized and funded. Army guidance is that all PM offices transition their TDA as they enter O&S due to an anticipated decline in personnel requirements. This transition process is described in the “Weapon System Resource Transition to Sustainment Guidance” memorandum by ASA(ALT) dated April 5, 2012 (Shyu, 2012). The PM TAS office properly developed a concept plan that describes the required composition of the office as the program transitioned into O&S, the justifications for each of the positions, and submitted it in accordance with the timeline described in the “Concept Plan Guidance” memorandum dated March 31, 2010 (Thurman, 2010). PM TAS’s concept plan was approved late due to the time required to vet the authorization through the process described in *AR 71–32, Force Development and Documentation* (Department of the Army, 2013a). Although the PM office submitted the request for change to their TDA authorization in a timely fashion, other agencies responsible for processing these changes took longer than expected. As a result, the authorizations occurred mid-FY16 rather than at the beginning of FY16.

At the onset of this research project, it appeared that the Army was not funding these positions, because of this delayed approval. This prolonged approval process resulted in a situation where the PM TAS office was being staffed with Army personnel that were not being funded by the Army, but instead were being funded by the Marine Corps. This was not boding well with the Marine Corps Program Manager, who despite desiring to maintain the joint office in order to continue supporting of the entire LW155 howitzer community, knew that paying for both the Marine Corps and Army personnel from just one service was unsustainable. Fortunately, the Army finally approved the concept plan and funding received for the Army personnel.

As the office shifts to the O&S phase of its life cycle, PM TAS updated the Supportability Strategy for the LW155 system to a combination of government support and a Performance-Based Life Cycle Support (PBLCS) contract for system repair parts. The Army is fulfilling the contract portion of the agreement by funding it via AMC, but at reduced levels set by the AMC funding managers (U.S. Army Audit Agency, 2015, p. 12).

C. FUTURE OF PM TAS AND LW155 O&S (2016+)

With the lack of initial funding support from the Army for PM TAS's original O&S set of governmental responsibilities, this period of transition was difficult at best. The PM TAS office has appropriately realigned their TDA staffing in order to meet mission requirements during the sustainment phase. The Army will continue to fund the sustainment contracts via AMC, however the concern of how much control the PM TAS office has over the actual O&S that the Army performs on the LW155 is the primary issue. AMC is tasked with funding and executing the O&S activities, while the PM TAS office has limited visibility into these actions.

D. PM TAS SUSTAINMENT PLAN FOR THE LW155

The PM office produced the required supportability strategy document and has a sustainment strategy that will allow the LW155 to maintain system operational readiness. This strategy combines both contractor and Army/Marine Corps organic capabilities to meet the needs of the weapon system. These supportability and sustainment strategies are in accordance with DOD 5000.01 for product support and have been approved by the system MDA. This sustainment plan is managed by the PM TAS via the Product Support Manager (PSM).

1. Government Sustainment Responsibilities

The Marine Corps Logistics Command (LOGCOM) and the Army's Tank-automotive and Armaments Command (TACOM) serve as the primary liaison and inventory control organizations for the LW155 weapon system. (M777A2 Sustainment Strategy, 2014) In addition, AMC acts as the contract agent for the performance based contract in support of the LW155. These high-level entities provide depot level maintenance, technical manuals, property control, provisioning as well as training for units that are using this weapon system (Gooding, 2014).

As with all military equipment, maintenance starts with the individual Soldier or Marine that is assigned to the howitzer. They perform daily maintenance in accordance with the appropriate technical manual. The Army uses preventative maintenance, checks

and services (PMCS) in order to assure that the howitzer is operational and maintained properly. If one of the checks indicates there is something wrong with the system, such as a tire that will not hold air pressure, the PMCS process will provide a solution. In this example it would be to add air, recheck after 30 minutes, and if pressure drops 5 psi, replace tire. These checks also indicate when the system needs to be inspected by higher-level maintenance personnel. In this example, the integration of contractors into this maintenance process occurs when the contractor provides a new tire and gives technical assistance to the higher level maintenance personnel.

2. Contractor Sustainment Responsibilities

Contractors, in this case BAE System, serve as the partner to the organic military personnel who provide the sustainment support to keep the LW155 operational. Their contracts provide spare parts, delivered from the manufacturer to the end user, provide engineering, logistics support and system reliability functions under their performance based logistics support contract. The division between government and contractor efforts is reflected in Figure 7 and is provided as reference as to how the LW155 is maintained. All of the organic and contractor tasks are provided by AMC as the PSP for this system. The management of this plan is the responsibility of the PM TAS office and the PSM.

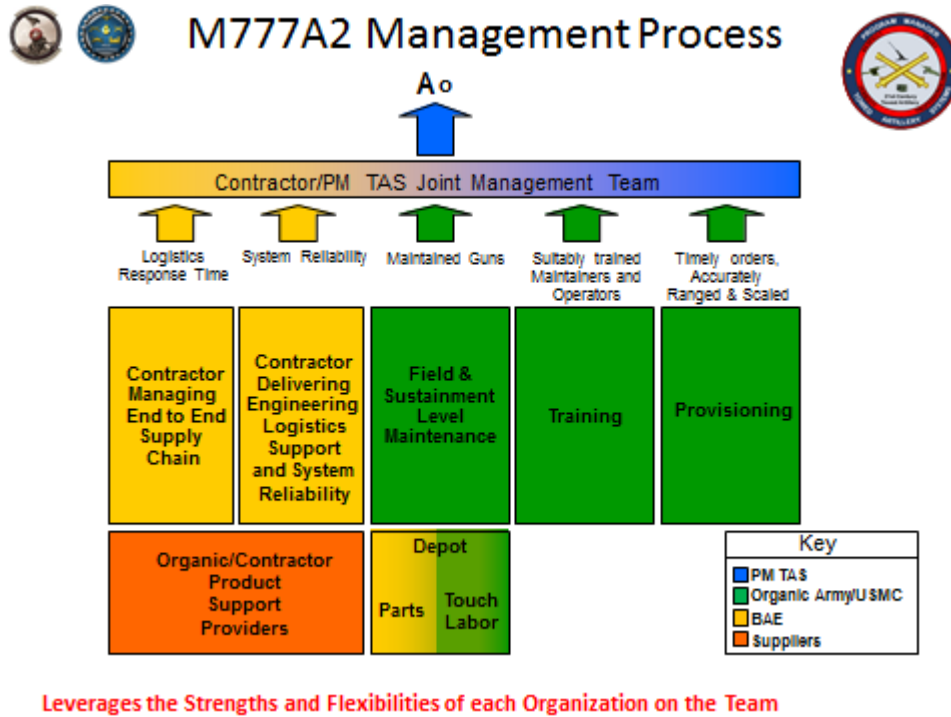


Figure 7. Contractor / Government Sustainment Strategy for the LW155.
Source: Gooding (2014)

E. AMC FUNDING METHOD FOR THE LW155 DURING O&S

The PSM works in coordination with the AMC, field personnel (operational units), and other key stakeholders to reduce costs where possible over the life of the system (Department of the Army, 2014b, p. 16). In accordance with DA Pam 700–127, the AMC is the PSP for Army organic depot and supply chain product support (Department of the Army, 2014b, p. 22). They receive O&M funds from ASA(FM&C) for all of the major weapon systems that are presently in the O&S phase of their life cycle within the Army (Department of the Army, 2013c, p. 101). They do not provide or act as a PM over these PEO-run programs; rather they act as the PSP to assure that performance requirements are met. By regulation, the PSP is responsible for meeting or exceeding the performance outcomes required in the performance based arrangements established by the PSM (Department of the Army, 2014b, p. 22). The challenge is when funds available

cannot cover the costs and there is a perception of a loss of control by the PM TAS office.

1. AMC's Challenge

As the PSP for multiple weapon systems, AMC must weigh the operational readiness of all systems, as well as other factors, when funding the acquisition PM's sustainment plans. This distribution of funds is within the authority of AMC to assure that the performance outcomes meet their performance requirements. The inability to provide complete funding for the PM TAS sustainment requirements leads to a perception of a loss of accountability for the PM TAS office. As an example, if a weapon system has an unplanned safety issue, which directly impacts the operational readiness, AMC must address this by shifting available funds in order to resolve the issue. Some may argue that this is a PM function, but it is not, as AMC is only funding the planned O&S required by the PM. They must carefully weigh the options when funding these efforts to assure that all weapon systems meet their minimum performance and operational availability standards.

2. AMC's Method of Funding Sustainment across all of Their Supported Systems

AMC has developed a methodology to identify which system receives the limited funding provided for O&S. The sustainment systems technical support (SSTS) funds are allocated through a criteria-driven process. Each system supported is compared to the others to identify where funding needs to be expended to maintain operational readiness thresholds for all of the systems. This process uses four criteria in order to provide a weighting for funds. The four are legal, safety, readiness, and area of responsibility. These areas are reviewed and a risk analysis is performed to determine the weighting for each of the categories (Army Material Command, 2013). See Figure 8 for weighting and values assigned.

Criteria

□ Relative importance of Criteria:

- ▣ Legal – 32%
- ▣ Safety – 32%
- ▣ Readiness – 21%
- ▣ AOR – 15%

Legal		
	Statutory	9
	Regulatory	5
	Policy	3
	None	0
Safety		
	High	9
	Serious	7
	Medium	5
	Low	3
	None	0
Readiness		
	Problem currently causing readiness issues?	9
	Problem projected to cause readiness issues?	5
	Proactive efforts to support readiness?	1
	Does not impact Readiness	0
AOR**		
	AOR 1	9
	AOR 2	7
	AOR 3	5
	CONUS/OCONUS	3

10

** AOR will be defined every round as AOR priority could change from year to year.

Figure 8. Criteria Weighting Scale and Importance. Source: Army Material Command (2013).

AMC solicits information from the PSM's as well as the operational units and safety offices. Through this system, AMC can justify to all concerned that they are properly managing the funding provided. Prior to this being implemented, AMC was the subject of a U.S. Army Audit Agency review and audit that found that funds were not utilized properly and consistently (U.S. Army Audit Agency, 2015, p. 4).

Once the criteria weighting is established, the process described in Figure 9 is followed. Note that the PSM is involved in the criteria, and the PM/PEO offices have input into a prioritization list, but the final approval is the LCMC, which is an extension of AMC (Army Material Command, 2013). Bottom line, the PM TAS is not in charge of prioritizing the funds during O&S, rather it is the AMC, but PM TAS (and all other PMs with operational systems) has a voice in the process.

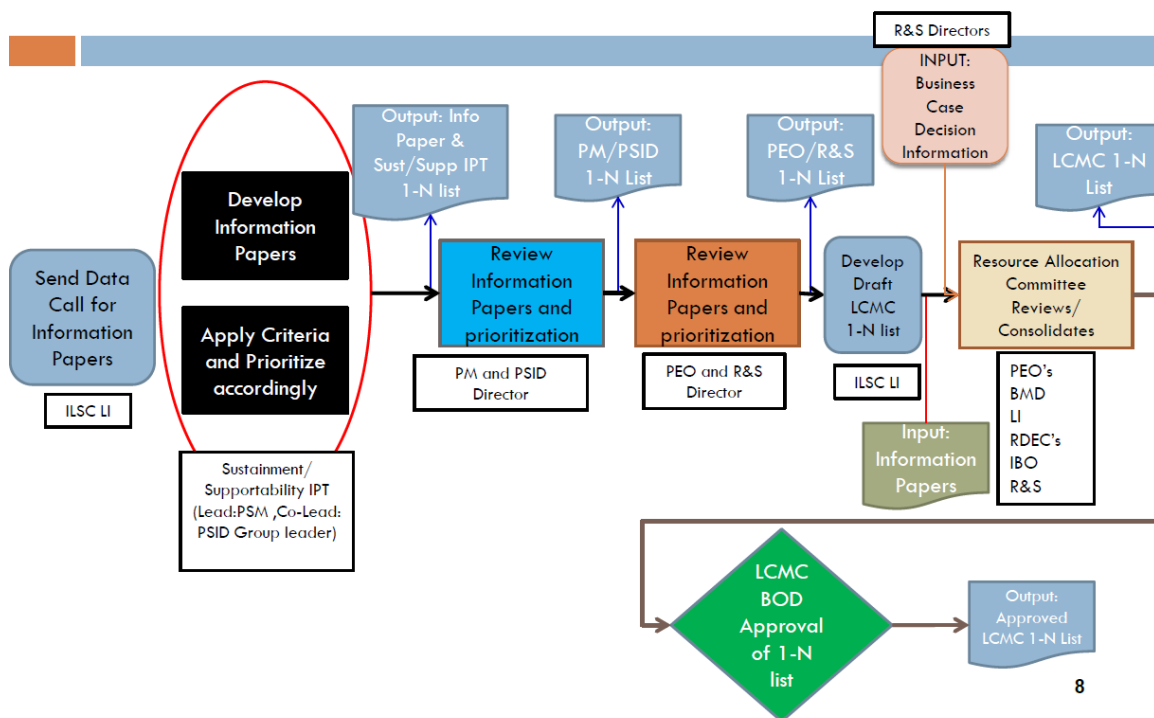


Figure 9. Current Process for Allocation of Funds for AMC. Source: Army Material Command (2013)

F. RISK OF NOT FUNDING THE LCMP AS REQUIRED FOR THE LW155

As the LW155 is supported both by the government and contractor services, there is a shared risk in failing to provide the sustainment activities from both sides of the team. The PM TAS office has developed and distributed technical manuals for the LW155, better known as the M777 series of howitzer. This manual describes the PMCS required to maintain and verify that the gun is ready to perform its mission. As an example of reduced availability risk, consider the following. In accordance with the PMCS manual, the tires on the M777 are required to be checked for wear, tire pressure and overall serviceability. If the Soldier/operator of the M777 notes that the tire wear is getting to the point of requiring a replacement, they will order a new tire. If there are limited funds available, the decision may be made at a higher level to not replace the tire, instead waiting for the tire to completely fail prior to authorizing a replacement. This may defer this preventative maintenance, but down the road, will result in a non-serviceable howitzer when the tire fails due to lack of tread. This will then become an operational impact and they will fund the replacement in order to maintain operational readiness rates.

1. Government Failure to Maintain

The organic personnel from the military will perform the required maintenance and operate the howitzer in accordance with the manuals provided by the PM TAS team. If they fail to maintain the gun properly, due to not following the manual, then there will be issues with the performance or reliability of the weapon system. As with the example provided, it is possible that the lack of maintenance will result in a non-operational howitzer. As these Soldiers and Marines are professionals, generally, the sustainability issues associated with the use of a PBLSC will be related to the availability and access to spare parts and contractor provided technical assistance.

2. Contractor Failure to Maintain

At some point, a part will fail or wear out, and a new part will be ordered. Depending on the part, the howitzer may become non-operational, which means it cannot perform its mission of accurately engaging targets. As the sustainment plan for this system ties contractor provided parts and expertise to the maintenance work performed

by the Soldiers and Marines, having a reduced capability can affect the readiness of the system. AMC, in managing the funds provided to them for this effort, can potentially degrade the readiness of the system by underfunding these contracts. The remedy for this is to add funds to these contracts in an emergency fashion, which will burden other AMC programs, or will require a request for additional funds. As this is being processed, there is the potential that the system could become non-operational and impact combat readiness and mission accomplishment.

3. Product Support Managers Role in Monitoring Risk

In accordance with DA PAM 700–127 paragraph 3–17, the PSM is responsible for continually updating the support strategy to reduce the cost of the effort (Department of the Army, 2014b, p. 17). They perform this effort by collecting data from the field to determine shortfalls and overages in their plan. They must work closely with the AMC in order to assure that any support shortages do not drop the readiness rate for the weapon system.

AMC can manage this by setting up the PBL contract in a manner to allow for cost growth during the period of performance. They then would confer closely with the contractor and the PSM to verify that the required sustainment efforts are being performed. The PSM can then recommend adjustments to the contract or the maintenance requirements of the contract (Department of the Army, 2014b, p. 17).

It appears that this process is presently working with the LW155 as the system was maintaining the required readiness rates (Gooding, 2014). Caution is warranted though, as it has been only a few years with AMC controlling the contract funds. A future review of the performance should be conducted to measure the effectiveness of AMC's management of funds.

G. SUMMARY

This chapter provided a brief history of the PM TAS office including the transition into the O&S phase of the LW155 system. It also provided insight into the current AMC processes that pertain to funding of the LW155 system for its operational

life. Finally, it described the method in which AMC provides funding to the weapon systems that it is tasked with maintaining. Chapter IV discusses the analysis and findings as focused on the primary and secondary research questions.

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IV. FINDINGS AND ANALYSIS

A. RESEARCH ANALYSIS

The first step taken was to review the DOD and Army policies outlined in Chapter II with the documents and information provided by the PM TAS office in order to determine compliance. From review of the documents provided, the PM TAS office complied with all aspects of the DOD and Army Requirements (Table 2).

Table 2. PM TAS Compliance

PM TAS Compliance to DoD & Army Policies & Guidance for LW155 Program						
Acquisition Phase	Action / Milestone	Pre-requisite / Requirement	Reference Regulation	Regulation Section	Compliance	Notes
Production & Deployment	Assign a PSM.	Mandatory at ACAT I & II program inception.	AR 700-127	Section 1-18		Section 805 of the FY10 NDAA is what mandates PSMs for ACAT I & II programs.
	Develop the APB.	MDA approval at MS B.	DoDI 5000.02	Enclosure 2, Section 6. b.		
	Develop the PBSS.	Must balance the use of government, public-private partnerships, and contractor support.	AR 700-127	Section 4-1		This action can be delegated to the PSM.
	Develop PBAs and PSAs in support of PBSS.	Must include appropriate performance metrics.	DA PAM 700-127	Section 4-17		This action can be delegated to the PSM.
	Develop and update the LCSP.	Starting at program inception, MS A.	DTM 10-015	Attachment 4, Section h.		Updates after every MS and as changes are needed or every 5 years (whichever first).
	Conducting Product Support Strategy Reviews.	At every strategy change or every 5 years (whichever first).	DTM 10-015	Attachment 4, Section i.		Reviews should consider opportunities to make better use of industry and DoD resources.
	Successful completion of OT&E.					
	Develop and submit a concept plan.	NLT two years prior to the end of production.	"Weapon System Resource Transition to Sustainment Guidance" ASA(ALT) memo, 5 April 2012	Section 5 d.		"Concept Plan Guidance" DA memorandum, dated 31 March 2010 provides the necessary guidance for development.
	Successful declaration of IOC.	Declared by the operational authority.	DoDI 5000.02	Section 5 d. (11) (b)		When operational community has been properly resourced and trained to support system.
Operations & Support	LW155 transfer to military service's operational, logistics, or materiel command.	Pass IOC and approved for FRP/FD.	DoDI 5000.02	Enclosure 2, Section 3. f.		
	PSM receives data from AMC on performance and readiness data.	As updates are needed during O&S.	DA PAM 700-127	Section 3-17 b.		
	PSM plans and executes transition activities per the LCSP.	After initial fielding.	DA PAM 700-127	Section 3-17 c.		Compliance based upon current status of system with last item delivered.
	PSM collects data on system readiness / end-user training for LCSP improvement.	Continuous throughout O&S phase.	DA PAM 700-127	Section 3-17 d.		PM believed to be performing as sustainment plans are updated, but no reason for update was given so not validated.
	PSM evaluates PBA's.	Continuous throughout O&S phase.	DA PAM 700-127	Section 3-17 e.		Information was not available due to early O&S for the LW155 system. Expect this effort to be accomplished routinely.
	MATDEV technology refresh program.	Continuous throughout O&S phase.	DA PAM 700-127	Section 3-17 f.		Information was not available due to early O&S for the LW155 system. Expect this effort to be accomplished routinely.
	Sustainment Readiness Reviews.	Post fielding support and weapon system reviews.	AR 70-1	Section 8-4		Information was not available due to early O&S for the LW155 system. Expect this effort to be accomplished routinely.
	Assure repair source is in accordance with title 10 USC 2426.	Continuous throughout O&S phase.	Title 10 USC 2426			
	Track demilitarization and disposal as well as plan update.	As needed to update the LCSP.	AR 700-127	Section 8-2		Information was not available due to early O&S for the LW155 system. Expect this effort to be accomplished routinely.
Legend		= Compliant		= Not Compliant		= Compliance Unknown

In the review of the organization and structure of the PM TAS office, it had the correct combination of personnel, to include the PSM. Additionally, a review of AMC's method of managing the funds provided to execute the O&S contracts and government efforts was performed. Again, it was found that AMC is executing their processes as required by regulation. This validation was found in the previously mentioned Army audit of the funds management and the aforementioned implementation of the funds management process.

B. PRIMARY RESEARCH QUESTION

With the transition to O&S, do current Army policies and processes allow PM TAS to effectively manage the LW155 system in accordance with the PM responsibilities outlined in the DOD 5000 series?

Although the operational readiness state of the LW155 howitzer system presently exceeds the system readiness requirement of 90% for the weapon system, the PM TAS office is encountering difficulty in managing the O&S of the system (Department of the Army, 2013b, pp. II-2). This is a direct result of their inability to direct the allocation of funds to their sustainment plan. In accordance with AR 700-125 and DA PAM 700-125, the Army is performing the required O&S based upon the performance based product support strategy (PBPSS) (Department of the Army, 2014a, p. 6). Although the AMC is providing the appropriate funding to maintain the level of performance and operational readiness of the LW155 system, they are not funding the sustainment plan to the level recommended by PM TAS. Provided the system is being operated in a manner that was anticipated when the LCSP was developed, this lack of funding has the potential to eventually lead to failures due to deferred, delayed, or not accomplished maintenance and/or inspections.

Due to AMC's method of managing the funding provided for sustainment of their assigned systems, the PMs for all of the systems being sustained by AMC, including the LW155, have only limited visibility of the funds available to execute the sustainment strategies for their respective programs. This is presently an effective way for AMC to manage the funds available across all systems, but does not provide PM TAS, or other

PMs within the PEO Ammo organization, with full confidence that their sustainment plan will be executed as required. As shown, AMC is responsible for implementing the sustainment for this weapon system, making the final funding decisions to adequately resource the Army's priorities. These actions, although in keeping with current DOD and DA policy, do hinder PM TAS's visibility into and ability to manage the LW155's status throughout the O&S phase according to their charter. The PSM can influence the process (Figure 9), and does receive feedback from AMC pertaining to operational and sustainment issues. They are able to use this data to evaluate their LCSP, however it was not clear as to whether data was being provided pertaining to the impacts of the reduced funding.

C. SECONDARY RESEARCH QUESTIONS

What is an Army PM's role and responsibilities within the O&S phase of system's life cycle?

The DOD 5000 series of documents serve as the authoritative source for a PM's roles and responsibilities, which are simply summarized as "the single point of accountability for accomplishing program objectives for total life cycle systems management, including sustainment" (Department of Defense, 2003, p. 10, Enclosure 1). Although the Army has specific policy and guidance addressing a PM's roles and responsibilities, these do not contradict nor take away from the foundation laid down by the DOD 5000 series.

Some Army-specific additions of note to the PM's roles and responsibilities include AR 70-1 Army Acquisition Policy paragraph 2-2, which describes the PEO and PM's responsibilities. It identifies the PM as the Material Developer (MATDEV) (Department of the Army, 2011, p. 8). It also requires them to "provide the planning guidance, direction, control, oversight, and support necessary to ensure systems are ... minimize life-cycle cost; and ensure systems are supported and fielded within cost, schedule, performance, and supportability baselines, providing a coordinated, Army wide solution" (Department of the Army, 2011, p. 6). Furthermore, it requires them to comply with the sustainment requirements in AR 700-127 Integrated Product Support including a Life Cycle Sustainment Plan (LCSP) (Department of the Army, 2014a, p. 36).

AR 700–127 lists the requirements of the PM office, typically identified as the MATDEV as well as the PSM. These duties can be found in Chapter III (Department of the Army, 2014a, p. 8). The specific requirements for the operation and sustainment phase are outlined in paragraph 3–8. Relevant requirements from this paragraph include monitoring of sustainment efforts against metrics and refinement of sustainment plans and LCSP based upon performance and evolving operational needs (Department of the Army, 2014a, p. 10).

Are PM TAS and PEO Ammo, by extension, following current Army and DOD policy?

In review of the TDA for the current PM TAS office, it has all of the key personnel that the regulations require, including the PM, PSM and support staff. Based upon the plan that is currently in place, from a DOD perspective, maintaining a Joint PM TAS office is the correct solution. This is based upon the cost savings of having a hybrid PBL/Government sustainment program and the fact there is no difference in weapon systems fielded between the Army and Marine Corps. The present hybrid process has AMC acting as the PSP by providing the PBL contract for both services. This minimizes costs and contract administration fees, as there is only one contract as opposed to two.

Compliance with certain policies, as indicated in Table 2, could not be ascertained due to the early stage of the O&S life cycle. An evaluation of these items could not be performed; however, we are confident that the PM TAS office and supporting operational elements have adequate organization in order to comply with the requirements. There was no indication in the documents reviewed that would indicate noncompliance.

What gaps, if any, exist within Army or DOD policy that fail to cover key aspects of PM’s role and responsibilities within the O&S phase of a system’s life cycle?

In the review of the PM TAS office, the primary issue focused on the loss of financial control of funds to pay for the PM TAS office personnel, as well as the O&S funds being allocated to implement their sustainment strategy. This lack of visibility and control is the primary gap discovered during our analysis of the office.

1. Gap 1: Personnel Finances

From our analysis of the personnel funding, it initially appeared that there was a gap that pertains to the tracking of the revisions to office staffing. Due to the inability of the PM TAS office to track the status of their concept plan for their office transition to O&S, the PM TAS office perceived a loss of control due to the lack of authorizations for the Army employees.

In order to receive funding for the positions within the PM TAS office, the TDA must have the positions authorized and funded. As noted, the PM TAS office successfully submitted a timely request for this TDA change. Army guidance is that all PM offices transition their TDA as they enter O&S due to a change in personnel requirements. This transition process is described in the “Weapon System Resource Transition to Sustainment Guidance” memorandum by ASA(ALT) dated April 5, 2012. The PM TAS office properly developed a concept plan that describes the required composition of the office as the program transitioned into O&S, the justifications for each of the positions, and submitted it in accordance with the timeline described in the “Concept Plan Guidance” memorandum dated March 31, 2010. PM TAS’s concept plan was approved late due to the time required to vet the authorization through the process described in *AR 71–32 Force Development and Documentation*. As a result, the Authorizations occurred mid-FY 16 rather than at the beginning of FY16.

At the onset of this research project, it appeared that the Army was not funding these positions, when in fact, they were. This issue resulted in an incorrect perception that O&S responsibility was being transferred away from the PM TAS office. Given the available information, we believe that PM TAS could have avoided the false perception mentioned earlier by being more persistent in their search for a status update.

2. Gap 2: Management of funds for implementation of O&S.

The current regulation provides funds for the operation and sustainment on the operational side of the Army. AMC is tasked, appropriately so, to assure that the Army’s weapon systems are operational and reliable for our Warfighters. The second gap is the method that the Army utilizes for funding the operation and sustainment of the system via

AMC. As AMC is the PSP for the LW155, they are provided the funds directly in accordance with *AR 750–1 Army Materiel Maintenance* regulation and DOD guidance (Department of the Army, 2013c, p. 101).

In layman’s terms, AMC is given the sustainment requirements by PM TAS, and then they execute it. If for some reason there is a funding shortfall, the sustainment requirements will be reduced or not performed. The PM TAS office does not have visibility of AMC’s funds until they allocate them to the LW155 program; AMC works with PM TAS to determine what is required to fund the LCSP and AMC informs them of the amount requested each fiscal year.

Once AMC receives the funds from the OMA appropriation, they fund their programs based upon the criteria driven weighting for funds allocation process. Only after this is complete does the PM TAS become aware of the funds received. AMC does confer with the PM TAS office on interpretation of the sustainment plan, to prioritize what portions are being implemented, but it is ultimately AMC’s decision. Although AMC is in compliance as the PSP, they are forced, due to fiscal constraints, to perform a management function of identifying what portions of the plan to implement.

D. SUMMARY

In this chapter, we analyzed pertinent regulations and policies. We then provided answers to the primary and secondary research questions, which leads us into the final chapter, where a recommended change is provided.

V. RECOMMENDATIONS AND CONCLUSION

A. RECOMMENDATION

Our recommendation is to improve the PM's ability to successfully maintain control of O&S system sustainment by addressing who is accountable for implementation of the Life Cycle Sustainment Plan (LCSP) during the O&S phase.

The LCMC should be accountable for implementing the LCSP. As AMC determines what gets funded and what does not, it is only reasonable to place the accountability on them rather than the PM offices of the systems they support. This is the situation that the PM TAS office is experiencing, as well as other programs under the current LCMC configuration.

As noted, the PM should not be held accountable for the execution of their maintenance/life cycle plan for a specific system when they do not control the funds required to execute this plan. There is a limit to this position, specifically, if the plan provided when fully funded, does not maintain the operational readiness for the system, then the PM should be held accountable for a defective sustainment plan. This delineation should be in DA PAM 700–127 Integrated Product Support Procedures. To assist the PM in determining accountability, additional information that is not presently identified in the regulation is required. The PSM must receive detailed information from the LCMC PSP as to which sustainment activities are underfunded, as well as the operational use of the system. This will allow the PM to analyze the field data to determine if the issue is with the plan, or with the funding of the plan. It would also place the accountability for the operational readiness of the system directly on the LCMC if the cause of the failure was due to not complying with the sustainment requirements set out by the PM. Note that the PSM currently reviews the operational use of the system to adjust the LCMP and accordingly the cost estimate.

Suggested revisions to *AR 700–127* and *DA PAM 700–127* are as follows:

1. AR 700–127 Revision

AR 700–127 outlines the material command's role during the life cycle of the program. Paragraph 1–19 outlines their responsibilities (Department of the Army, 2014a, p. 5). A revision to this paragraph would clarify that they, as the PSP are accountable for complying with the LCSP for their assigned systems. A new paragraph under 1–19 e would state:

AMC is accountable for the funding and execution of the LCSP after delivery of the final item for the system until disposal. Any LCSP not fully implemented must be documented with the PSM in order to perform a risk assessment for the system.

2. DA PAM 700–127 Revision

For the reader's clarity of the revision, the following is directly from the pamphlet *DA PAM 700–127 Integrated Product Support Procedures*, with our recommended revision in underlined italics.

3-17 Operations and Support Management

a. The final Post Production Support Plan (PPSP) is completed prior to production phase-out and schedules are established for reviewing and updating the PPSP throughout the life cycle.

b. Following the fielding of all ACAT level materiel, equipment performance and readiness data will be gathered through the appropriate supporting logistics information systems and at the U.S. Army Materiel Command (AMC) Logistics Support Activity (LOGSA), who collects and monitors the data not available during developmental and acceptance testing. PFSA is a LOGSA tool that can be used to minimize support costs and develop either materiel modifications or new materiel with improved supportability and reduced life cycle costs.

c. After the initial fielding to Army units, the PSM plans and executes all transition activities identified in the LCSP. One transition may be transitioning the support during production to support after production has been terminated (this should be reflected in the LCSP). Another transition may be the changeover from interim contractor support (ICS) or contractor logistics support (CLS) to the objective support identified in the LCSP. All transitions need to be planned far enough in advance to ensure that there is no interruption in the programming and budgeting functions for life cycle support resources.

(1) Upon the transition after production has terminated and CLS changeover the LCMC shall be accountable for implementing the requirements set forth in the LCSP. The PM is not responsible for the operational readiness of the system unless there is a deficiency in the LCSP which cause the failure.

(2) PSM's will monitor the implementation of the LCSP by the LCMC to provide recommendations and refinements based upon actual field data, to include funded and unfunded portions identified by the LCMC. The PSM will recommend emphasis areas for future funding to the LCMC in order to reduce the risk of failure to meet readiness requirements.

d. The PSM, with the support of the PSMIPT, uses data collected from the field readiness and maintenance reporting system and field-training exercises for analysis with the objective of continually improving the support structure and reducing O&S costs. Efforts will include identifying cost drivers due to failure rates that increased costs of replacement parts, and performing a Level of Repair Analysis (LORA), as defined in SAE AS1390, to validate the established support structure. Automated tools, such as the PFSA, can be used to process and analyze the field data against specified metrics. LCMC's will provide detailed reports of funds obligated toward the sustainment strategy within 90 days of obligation including a risk analysis of items not fully funded. This report will be provided to the PSM for comparison to readiness rates from previous years in order to provide recommendations to the LCMC.

e. The PSM collects and evaluates the actual field data against the metrics specified in the Performance Based Arrangement (PBA(s)). These data and evaluation results will be provided to all PBA stakeholders and corrective actions are taken when required. PBAs will be updated as required throughout the materiel's life cycle to reflect revised product support strategies in terms of performance-based goals tied to performance metrics.

f. The MATDEV institutes a continual technology refreshment program and initiates materiel changes, as necessary, to improve supportability, reduce LCC, and decrease the logistics footprint of the materiel.

g. Refining the planning process assures the continuing sustainment and maintenance of materiel and can include the following:

(1) Life cycle savings through improved O&S methods.

(2) TI.

(3) Evolutionary acquisition and preplanned product improvements.

(4) Value engineering improvements.

(Department of the Army, 2014b, pp. 16–17)

B. CONCLUSION

Army PMs have their roles and responsibilities detailed primarily within the DOD 5000 series of documentation, which state that a PM has responsibility for a system throughout its entire life cycle. There is a conflict between the responsibilities, outlined in the DOD guidance, and the authority for sustainment execution, represented by the sustainment funding allocated to AMC. The execution of this responsibility into the O&S phase of the acquisition process is complicated as the Army and user communities attempt to comply with Army guidance regarding sustainability responsibilities. This phase of the system's life cycle, where the system in question is exposed to the PM, LCMCs, and other operational communities all at the same time, can easily lead to conflict over the funding and programmatic control of the system.

The successful execution of the O&S phase for any system is predicated on the collaborative efforts of several key stakeholders. Army, or DOD guidance cannot hope to appropriately mitigate the risk of conflicts between these key stakeholders without first establishing clearly defined roles and responsibilities for not only the PM, but for the primary, key stakeholders the PM is expected to interact with throughout the O&S phase. The O&S phase, the longest and most expensive phase of a typical system's life cycle, is not a time to introduce such uncertainties and destabilizing power struggles, for not only the sake of the system's total cost but also for the quality of operational support the system provides the Warfighter.

This JAP delved into the specific area concerning the O&S phase of the life cycle for the LW155 howitzer and how the PM can maintain control. It was found that although the PM is charged with system life cycle sustainment, conflicting guidance to the operational side of the Army and the acquisition side has resulted in a struggle between the two due to how the funding is managed. Although this process is working, it fogs the line of who is really accountable for the readiness of a weapon system once fully fielded.

Our recommendation formalizes the accountability and, if adopted would clearly delineate who is accountable for the sustainment of these systems during the O&S phase.

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